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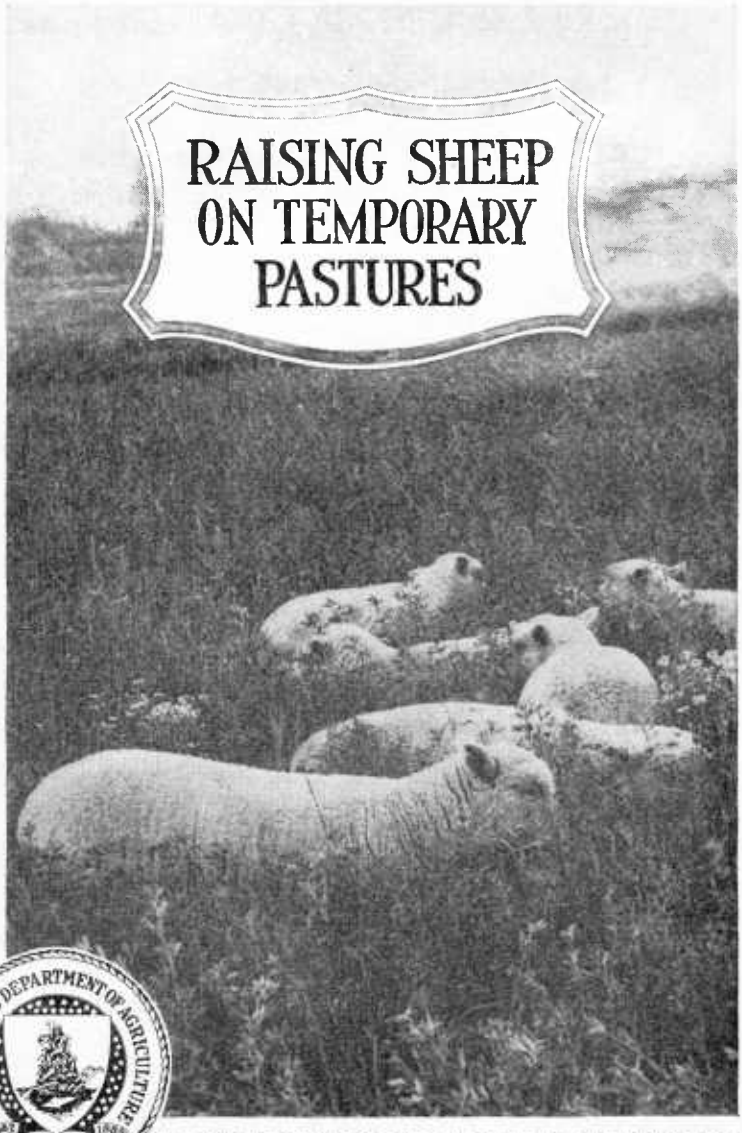

RAISING SHEEP ON TEMPORARY PASTURES

TEMPORARY pastures for sheep may be used for all or part of the grazing season. Their use makes it possible to fit the flock into the livestock farming system with very little change in the usual methods of producing feed and pasturage for cattle and swine.

By using temporary pastures the flockmaster is able to maintain a uniform milk flow of the ewes, which insures rapid development of the lambs to market size.

The use of temporary pastures assists greatly in the prevention of infection by stomach worms and other internal parasites. Frequent changes to new pasturage can be made and losses by death and lack of thrift prevented.

A system of temporary pastures for sheep raising permits the use of lands of low fertility and at the same time insures a revenue from them without an expensive outlay for commercial fertilizer. Only lime, phosphorus, and inoculating material are necessary to enable poor soils to produce legumes.

This bulletin explains the advantages and methods of using temporary pastures for sheep and gives results of experiments conducted at the Animal Husbandry Experiment Station, Beltsville, Md.

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RAISING SHEEP ON TEMPORARY PASTURES

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CONTENTS

CROPS USED FOR TEMPORARY PASTURES

ANY ANNUAL CROPS that are sown for the purpose of being pastured off before maturity are called temporary pastures.[1] They may be used as the sole pasture crop for all or for a part of the grazing season. Their use as pasture for sheep fits into the livestock farming system with very little change in the usual methods of producing feed and pasturage for cattle and swine. The carrying capacity and value of the following crops are discussed in this bulletin: Fall-sown wheat, rye, and barley, and alfalfa; spring-sown oats and peas, rape, cowpeas, Italian ryegrass, soybeans, and corn and velvet-beans.

In many localities fall wheat or rye is grazed during the winter and early spring and then allowed to mature a grain crop. The same practice is possible with spring-sown cereals, but is less often practicable with cowpeas and soybeans. The temporary pasture crops suitable for sheep are equally valuable for hogs. In case a crop is to be used for both kinds of stock the feed should be kept fresh for the sheep, either by dividing the field or having the hogs follow the sheep.

Surplus cereal and legume crops from the pastures can be cured into first-class winter roughage for sheep.

ADVANTAGES OF TEMPORARY PASTURES

The use of temporary pastures aids in utilizing the economic peculiarities of sheep. This is true because a succession of a variety of fresh forage crops produces the maximum milk flow in the ewe, and lambs are largely a milk product. The lambs most in demand at the markets are those that reach a desirable weight and finish

[1] The occasional pasturing of a permanent crop like alfalfa is also advisable in a system of temporary pastures.

while still sucklings. Returns from the sale of such lambs are the quickest that can be obtained for a finished product in any line of livestock raising.

Permanent grass pastures are well suited to ewes with lambs, but as the lambs become larger and able to use more milk the feed is likely to be cut short by dry weather. Special seedings of annual crops at different dates give greater assurance of good milk-producing pasture when most needed. In most parts of the country, however, lambs can be marketed best before the usual date of dry weather.

On most high-priced lands a ewe's feed can be produced more cheaply from annual crops sown to be grazed than on permanent grass pasture. The extent to which the extra amount and value of the forage crop will offset the extra costs of fencing, plowing, and seeding depends upon the value of the land.

AID IN CONTROL OF PARASITES

An aid in controlling the ravages of stomach worms and other internal parasites is one of the advantages to be obtained by using temporary pastures for sheep. Losses by death or lack of thrift are most serious among lambs of flocks that are kept season after season on old grasslands. With only a few sheep on a large area of grass which is also pastured by other stock, the danger from stomach worms is less likely to be serious. With closer grazing by sheep during several months of each season the danger is increased and is most serious in sections or in seasons of high temperature and excessive moisture. Alternating permanent pastures during the season minimizes but does not eliminate the danger of infestation.

Though rotation of temporary pastures is a useful aid in diminishing the ravages of stomach worms, the plan requires that the flock should not go on a field a second time unless the land has been plowed in the interim or time enough has elapsed to cause the death of the stomach worm larvae that have been left upon the field grazed by infected sheep.[2]

On farms provided with a large number of fields with fences suitable for sheep, a succession of clean temporary pastures can be provided. In most cases it is more economical and more satisfactory to provide permanent or movable fences for a number of smaller pasture lots, on each of which two or three crops can be grown each season to a stage suitable for grazing. On larger lots a system of hurdles can be used to permit access to a portion furnishing only 1 or 2 days' feed. It is more satisfactory to have lots of a size to furnish from 10 to 14 days' feed for the flock. Two weeks is the longest time that one piece of ground should be used during the warmer part of the season. Young lambs are most susceptible to injury from parasites and are exposed to less danger when moved to fresh ground at intervals of not more than 2 weeks than when permitted to remain longer on the same fields.

IMPROVEMENT OF SOIL

An additional advantage in using temporary pastures for sheep raising is the improvement of the soil. The greatest demand upon

[2] Farmers' Bulletin 1330, Parasites and Parasitic Diseases of Sheep.

fertility is avoided by not requiring the crops to mature seed. All the manure is distributed upon the ground together with all uneaten parts of the crop. With legume forages the gain to soil is especially valuable and allows production of still larger crops, which are again returned to the land, diminished only by the materials utilized by the lambs or ewes while on that particular crop.

VALUE AND USE OF TEMPORARY PASTURES

In raising sheep under a temporary pasture system there is not much choice of crops to be used in different months. It is chiefly necessary to make sure of having a crop ready when the preceding one is finished. In the Middle Atlantic States, fall-sown wheat, rye, and barley, followed by spring-sown oats and peas, soybeans, and fall seedings of the previously mentioned cereal crops, are usually quite satisfactory in a rotation of crops that will furnish continuous grazing from April to November. All of these crops are of value in stimulating a good flow of milk in the ewes; they produce good growth in the lambs and put the ewes in good condition for breeding after the lambs are weaned. It is sometimes an added advantage to allow the ewes that are raising lambs one-half to three-fourths of a pound of grain each, daily, until the lambs are weaned. All lambs kept for breeding purposes should be fed some grain throughout the summer. Also a light feed of grain given to the ewes while on pasture during September and October will tend to put them in a gaining condition during the breeding season, and prove economical in the case of a scarcity of pasture.

CARRYING CAPACITY AND USE OF VARIOUS CROPS

Studies of the carrying capacities of various crops used as temporary pastures for sheep have been made at the Animal Husbandry Experiment Station, Beltsville, Md. In determining how far the feed furnished by temporary pasture crops will actually go for mature sheep, allowance is made for the lambs. It is considered that a lamb will eat one-tenth as much pasture in March, when about 6 weeks old, as a sheep, and an additional one-tenth each month thereafter throughout the grazing season.

During an 18-year period sufficient pasturage was produced on each acre of temporary pasture to furnish one mature ewe with an average of 321 days of grazing. This is equivalent to a rate of stocking of slightly more than one and one-half sheep an acre for a 200-day period. Fertile land in a high state of cultivation should produce 50 to 100 percent more pasturage than that obtained in these studies.

The average number of days of grazing from 1 acre of each crop during the 18-year period, as calculated on the pasture value for one mature ewe, is shown in table 1.

Fall-sown wheat and barley, and spring seedings of oats and peas are very satisfactory for grazing in spring and early summer. Pasturing on wheat and barley starts early in April in most cases and these forages continue suitable for use until about the middle of May. Barley is particulary well adapted for late fall pasture and it is relished by sheep.

Wheat makes excellent pasture for sheep, and if the pasture is managed carefully a large quantity of feed may be obtained. Because of their varied growing habits, wheat and rye grown together are especially suitable for supplementing permanent pastures in the early spring. The rye tends to keep the wheat from winter killing, and the wheat produces palatable feed much later in the spring.

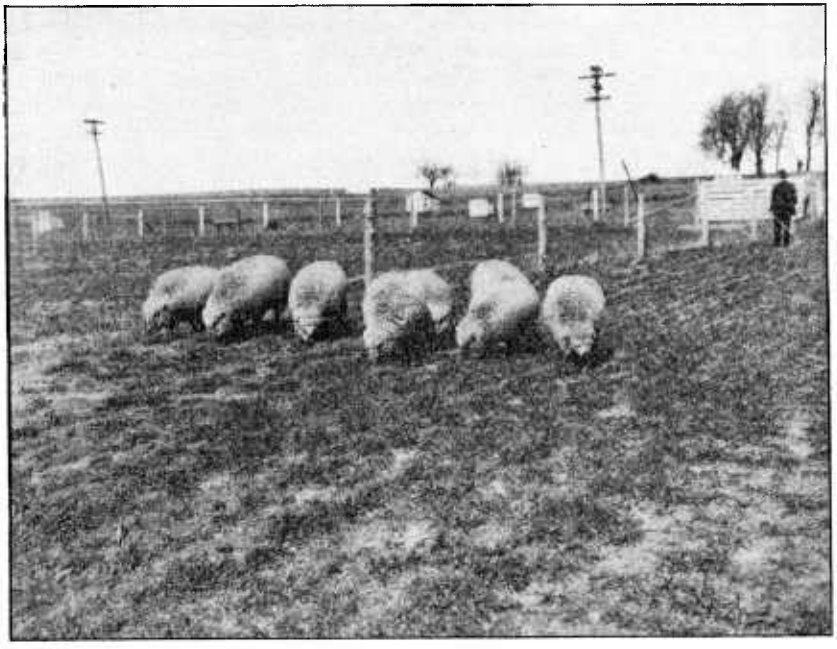

FIGURE 1.—Wheat is a very satisfactory spring forage. Yearling ewes on wheat at Beltsville, Md., March 16.

Rye planted alone is not relished by sheep so much as is wheat, and rye heads out more quickly. In this stage sheep do not eat either leaves or heads to the same extent that they eat wheat. To get the most out of rye with ewes and lambs it must be kept closely grazed. Barley and rye grown together furnished a fair amount of late fall and early spring pasture.

Rye is especially valuable for winter grazing in the Southern States. In winter-wheat sections wheat is grazed in winter and part of the spring with great advantage to the animals and to the grain crop as well.

After the above crops, oats and Canada field peas grown together furnish most of the grazing until soybeans are ready. The oats and peas may be sown early, and seedings at different dates insure pasturage that is still succulent and tender until soybeans are available.

Rape is well known as a forage crop for sheep and lambs. It is hardy and therefore suitable for sowing in April or early spring. When planted later, the crop may be adversely affected by dry weather and become less palatable than earlier plantings. Rape is adapted to a fertile soil and a plentiful supply of moisture. Well-grown plants

withstand considerable frost, and the crop should be useful for extending the grazing season late into the fall.

FIGURE 2.—Ewes and lambs in rape, Beltsville, Md., June 20.

Lambs require several days to learn to eat rape readily, and it is an advantage if they can spend a few hours each day in some other crop until they have learned to like rape. Bloating rarely occurs in sheep pasturing on rape, but it is well to inspect them frequently during the first few days on this crop or in frosty weather. Rape has considerable fattening ability and can be used to advantage in finishing lambs for the market. This crop ordinarily yields better and is grazed with less waste when planted in drill rows.

FIGURE 3.—Lambs in soybeans, Beltsville, Md., July 10.

Soybeans are ready for grazing about the middle of July and furnish excellent feed until October. Early seedings may be made in April

and May and later seedings through June and July and in some seasons early August. Plantings should be ready for pasturing about 7 or 8 weeks after they are sown.

TABLE 1.—*Days of pasture per ewe, from different crops*

Crop	Years grown	Pasture per ewe	Crop	Years grown	Pasture per ewe
	Number	*Days*		*Number*	*Days*
Alfalfa	2	536	Wheat	7	278
Italian ryegrass	3	534	Barley	11	259
Rape	3	392	Rye	10	243
Soybeans	18	354	Wheat and barley	4	387
Corn and velvetbeans	12	337	Wheat and rye	6	318
Oats and peas	17	318	Barley and rye	4	208
Cowpeas	3	301	Permanent pasture	18	716

If not pastured too heavily, early plantings will produce a second growth that will provide practically half as much additional forage as the first growth. This feature of making new growth after being grazed is a valuable one in soybeans, and sheep and lambs eat the crop with great relish. When sown in corn, soybeans serve as an excellent supplement to the corn for fattening lambs in cornfields.

Cowpeas are planted at the same time of year as soybeans and grow at about the same rate. Cowpeas produce about as much feed as soybeans but are less palatable for lambs and require a warmer climate, and the crop does not make so much second growth as do soybeans. In some sections of the Middle West lamb feeders have made good use of cowpeas by planting them in the corn, thus producing more forage that remains green until frost.

Velvetbeans furnish good grazing for sheep. On account of the long vines, it is necessary to grow them in conjunction with some supporting crop. Velvetbeans can be planted to greatest advantage with corn. If the velvetbeans are planted at the same time as or after the corn, usually they do not begin to run until the corn is well grown. Combining the two crops increases the quantity of feed per acre and prolongs the period of grazing longer than corn with soybeans or cowpeas can be grazed.

Alfalfa may be used as sheep pasture in the spring and in the fall. Except for its tendency to cause bloating, it is a good feed for sheep and lambs. Danger of bloating is greatest when the alfalfa is wet. The sheep should not be turned onto alfalfa when they are very hungry. Neither should they feed long at a time on this crop during its first few days of growth. Because it is so watery while very young alfalfa has the highest feeding value when the plants are above 6 inches in height. Alfalfa does not fit well in a temporary pasture system because the interval between grazings is not sufficient to eliminate the infective larvae of internal parasites that may be present as a result of previous infestation. Cutting one crop for hay before the second grazing may reduce this danger, but does not wholly eliminate it. The risk from feeding the cured hay would be slight.

Italian ryegrass pasture is relished by all classes of livestock. Italian ryegrass is a short-lived, rapid-growing perennial, and although not widely used in the Atlantic Coast States it is adapted to these sections. It is a very early crop, and the seed falls readily when mature, so that

it reseeds itself freely. It may be sown in the fall or spring. In the South Atlantic States fall seeding gives the most satisfactory results.

COMBINATION PASTURE CROPS

The object of making mixtures of leguminous crops or cereal grains for sheep pastures is largely to increase the yield and quality of the feed. Canadian peas added to spring-sown oats, for example, improve the quality of the crops, whereas the oats provide a means of keeping the peas erect and prevent loss from trampling. At Beltsville combination crops of wheat with either rye or barley produced approximately 35 percent more grazing than any of these crops grown alone (table 1).

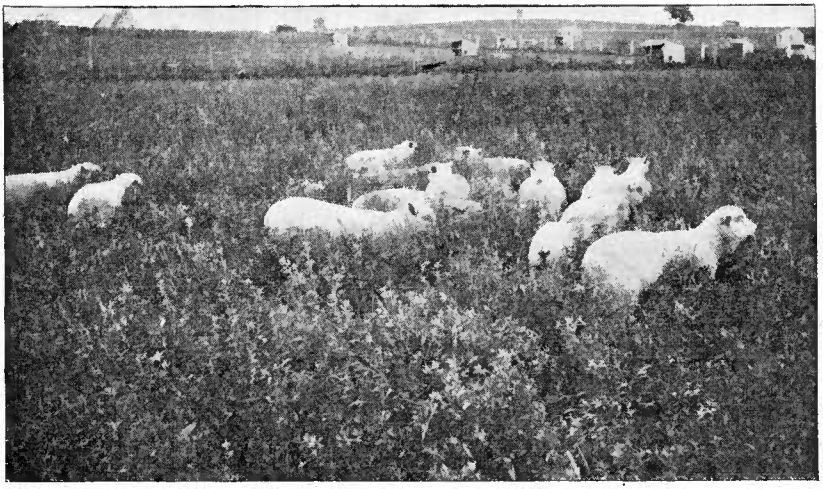

FIGURE 4.—Lambs in alfalfa, Beltsville, Md., July 7.

HEALTH OF SHEEP

Injury caused by internal parasites may be reduced by providing temporary pastures for sheep under a plan that allows them to go to fresh ground at intervals of not more than 2 weeks. Most flocks have some degree of infection of stomach worms. In warm, moist weather the eggs in the droppings of the older sheep develop in a few days into larvae, which are especially injurious when taken up by lambs. Some of these larvae may die when land is plowed, and it is for this reason that plowing is recommended on reseeded land after a crop has been pastured.

Older sheep are less susceptible than lambs to the effects of stomach worms. There is less danger in allowing them to remain longer than 2 weeks on the same ground or in using up feed left in fields from which lambs have been removed. Because of the continued chance of infection of lambs from grass along fence rows and in unplowed yards and barn lots complete freedom from parasites is seldom obtained.

In pasturing ewes and lambs on temporary pastures stomach worms may be kept well under control until August or September. However,

during the summer months it is advisable to give the sheep medicinal treatment as a further means of control.[3] In flocks changed to fresh ground every 2 weeks treatment should seldom be needed for lambs marketed in May and June. Temporary pastures on clean land are particularly useful for ewe lambs retained as breeders, though treatment for parasites would probably be advisable as a precautionary measure.

SIZE OF LOTS AND METHODS OF FENCING AND GRAZING

The convenient size for temporary pasture lots is determined mainly by the size of the flock. For health and for economical use of the pasturage it is undesirable to keep sheep on the same ground more than from 10 to 14 days. A useful size of lot is 1 acre to 25 sheep. This area on an average furnished 14 days' feed.

Arranging the size of lots on the basis of 1 acre to 25 sheep is more satisfactory than seeding larger areas and using hurdles to permit advance to fresh feed each day. Less labor is necessary, and by going to entirely new ground after 10 to 12 days the danger of picking up parasite larvae on ground grazed over earlier is prevented. With a 1-acre lot for 25 ewes or correspondingly larger lots for larger flocks it is an added advantage if the length is two or three times the breadth. With a heavy crop of forage that would last longer than was considered safe to hold the flock on the same ground, a short piece of cross fencing can readily be used to divide the pasture into two parts. The smaller lots are also convenient with purebred flocks to provide for separate pasturing of smaller lots of ram and ewe lambs.

Movable fencing is not likely to be satisfactory for the outside-lot fences unless the whole area to be used lies in a long strip with side fences, when only two end pieces need to be in place at one time for the ground being grazed.

A handy style of movable fence consists of a roll of 32-inch woven wire supported by posts made of half-inch iron rods. This post is known as the Illinois post.[4] Eight inches from the bottom there is a branch at right angles to the post. This branch runs out 6 or 8 inches and turns downward parallel with the post itself. This post can be set readily by pressing on the branch with the foot. The shape of the bottom part gives bracing enough to prevent the sheep from pushing the fence over. The bottom of the fence is kept in place by passing the post between two of the lower wires. The top wire lies in a groove made in the top of the post.

EFFECT ON THE LAND

The use of a system of temporary pastures in sheep raising has certain advantages. Improvement in soil fertility is accomplished through the manure distributed on the land by the sheep, by the plowing in of unused parts of crops, and through other beneficial effects of legume crops, soybeans in particular. If the land is below average in fertility the application of either commercial fertilizer or manure may be essential to the production of satisfactory crops.

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[3] Medicinal treatment for stomach worms is described in Farmers' Bulletin 1330, Parasites and Parasitic Diseases of Sheep.

[4] The Illinois post and other kinds of equipment for sheep raisers are illustrated and described in Farmers' Bulletin 810, Equipment for Farm Sheep Raising.

The type of soil on which temporary pasture crops are grown will govern somewhat the manner in which they can be grazed. If the soil is very heavy it will not be benefited by trampling; in fact holding the sheep on the lots in wet weather will have a harmful effect. If it is necessary to keep the sheep upon a crop night and day it is essential that shade and water be provided in the lot.

FORAGE ROTATIONS FOR DIFFERENT REGIONS

Although the crops described herein seem best adapted to the Middle Atlantic States, it does not follow that they would be best for regions in which climatic conditions are very dissimilar. For instance, in New York and the New England States, rye, oats and field peas, and rape should form the principal part of the rotation, with alfalfa or permanent pasture to fill the gap between rye and oats and field peas, the last two being grown together. Plantings of rape following both of the crops would furnish feed in the autumn as long as the sheep could be left out.

In the South Atlantic and Gulf Coast States a greater variety of forage crops is available. Table 2 indicates groups from which selection could be made, together with the months in which they would be most desirable for sheep pasturage.

TABLE 2.—*Grazing periods of different crops*

Group	Crops	Time available for pasturing
1	Wheat, oats, rye, Italian ryegrass, or rape	Jan. 1 to Apr. 30.
[1] 2	Lespedeza, Bermuda grass, carpet grass, ripe oats, alfalfa	Mar. 1 to June 30.
3	Early varieties of soybeans and cowpeas	June 1 to July 30.
4	Late varieties of soybeans, cowpeas, velvetbeans, sorghum, and millet	July 1 to Nov. 30.
5	Winter rye, oats, barley, wheat, and rape	Oct. 15 to Dec. 31.

[1] Group 2 could be cut later for hay.

Group 2 consists of meadow or permanent pasture plants which could be pastured for a few weeks each spring without danger of serious infection from stomach worms. The choice of the crops from each of these groups should depend upon the degree of success with which they are grown in any particular region.

Supplementary literature on the production of various forage crops may be obtained by consulting lists of Department publications or agricultural extension workers.

ROTATIONS WITH PERMANENT PASTURES, STUBBLE FIELDS AND TEMPORARY PASTURES

When it is not practicable to use a system of temporary pastures to provide the change of pasture necessary for protection from parasites, an effective system can be arranged in the regular crop fields of most stock farms provided there is a sufficient number of fields having sheep fence. It is necessary that the lambs, and so far as possible the ewes, should be moved to new pasturage at intervals of not longer than 2 weeks without returning to any land that has not been plowed since it was grazed by sheep. In freezing weather these frequent changes are not necessary from a health point of view.

In a plan of providing a change of pastures in a stock-farm crop rotation, the earliest grazing is furnished by fall-sown wheat or rye. This can be used for 2 weeks in freezing weather even though the crop has been grazed previously during the winter. Following this, the flock is placed on permanent grass pasture upon which there were no sheep during the previous year. If the second, or grass pasture, free from infection, is not available, a red clover crop is used. Ordinarily this would be the same land upon which the sheep grazed wheat at the beginning of the previous year. In most sections the danger of infection in such case would not be a serious one. By the time the third change is necessary some clover fields have usually been harvested for hay and the second growth can be used for grazing. At this time of year (early fall) on farms producing such crops as mentioned for other livestock, lambs will usually be marketed. The ewes, if necessary, can return to some of the land previously used. This does not allow the same degree of protection from parasites as would exist if there were no pasturing the second time without intervening plowing, but the effects of the parasite are less serious in older sheep, and treatment can be given to those ewes that show the need for it, to prevent a serious setback.

For ewes or for lambs that are carried later in the year, later pasturage is furnished in the stubble fields of the grain crops, and after that from rape sown in the cornfields. At a still later time the early fall-sown grain furnishes pasturage until the coming winter.

One or two acres of rape or some other forage crop will usually be found desirable as insurance against possible shortage of pasturage in other fields, and more particularly as a safe and satisfactory feed for ewe lambs retained for breeding, and which cannot safely remain with the ewes, particularly if the latter are spending part of their time upon land that may be infected.

SPECIALIZED SHEEP FARMING

At present farms devoted mainly to sheep raising are not numerous. The opportunity exists for specializing in sheep raising with the same prospects of profit as are to be obtained from specializing in other lines of livestock production. In a plan of specialized sheep raising larger reliance necessarily would be placed upon temporary pastures. The results of experiments reported in this bulletin demonstrate that with the rotation of grazing and plowing for reseeding, land can be stocked heavily with sheep year after year without the development of serious difficulties. The necessary winter feed for a specialized sheep farm can be produced in connection with the regular temporary pastures. Extra seedings of leguminous crops can be harvested for hay, and in most seasons there is likely to be a part of some crop which is not needed for pasturing and can be cured for winter feeding. With the production of silage for a part of the roughage fed in winter the amount of land required is reduced to a minimum.

MOST SUITABLE SOILS

Land suitable for a system of this kind should be level or only slightly rolling, and of a rather heavy soil texture in order not to wash

readily with the plowing necessary to provide the maximum amount of pasturage and protection from parasites.

PROTECTION FROM DOGS

One of the principal drawbacks to sheep raising in the Eastern States is the damage done by sheep-killing dogs. Practical protection may be had in this system of farming by making the outside fence dogproof.[5] The construction of a fence of this sort, although practically impossible on lands generally used as sheep pastures, is easily accomplished with little additional expense in level-lying lands.

DISTRIBUTION OF LABOR

Labor is one of the principal problems in carrying on many agricultural projects. It is necessary for the farmer to arrange his work so that he will be able to give constant employment to all his men.

Specialized sheep farming offers the advantage of more even distribution of labor throughout the year than most other forms of specialized farming. There is no particular rush season, as the lambing season is over before the land is ready for spring planting. Other plantings are necessarily made from time to time throughout the summer in order that fresh pasturage may be available at all times. Such harvesting as must be done comes at different times throughout the year when feed is available for cutting.

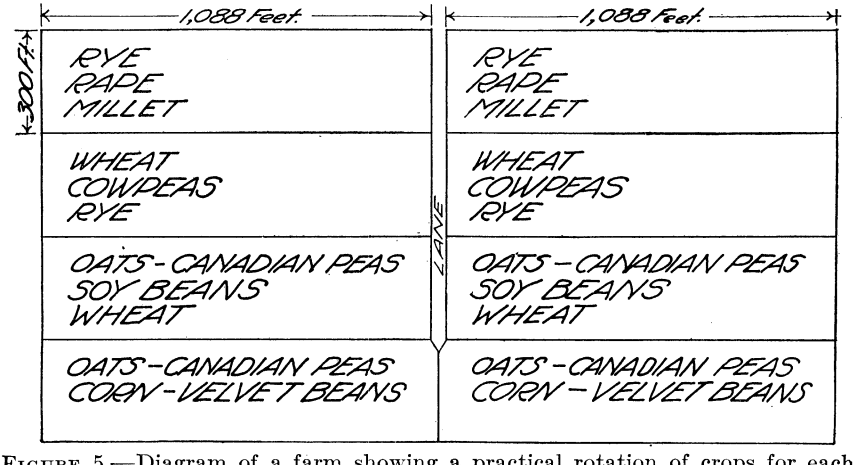

FIGURE 5.—Diagram of a farm showing a practical rotation of crops for each field for Central Atlantic and Corn Belt States.

Figure 5 shows a model farm plan for specialized sheep raising, and indicates a practical rotation of crops for each field for Central Atlantic and Corn Belt States.

[5] See Figure 29, Farmers' Bulletin 810, Equipment for Farm Sheep Raising.

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